Operating Program

Automobile Shredding Plant

Metal Management Midwest, Inc.

2500 S. Paulina Street

Chicago, IL 60608

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1.0 Contact Information

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Operator Contract:	Deb Hays
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2.0 Facility Map

A facility location map (Figure 1) and detailed facility map (Figure 2) are included in Appendix 1. The map displays ground surface conditions, storage pile areas, conveyor loading/ unloading areas and general traffic flow.

3.0 Pollution Control Equipment & Best Management Practices

The Shredding System utilizes several pollution-control methods and equipment:

1. Water is used in the hammermill to reduce dust from shredding operations and on the subsequent conveyor system. The smart Water system monitors electrical amperage from the motor rotating the hammers inside the hammermill and the increases water spray as amperage increases.
2. A Closed-loop Z- Box is used to clean the ferrous material (see Appendix 2 for details). The Z-Box allows ferrous material to drop through an air current that lifts nonferrous and nonmetallic materials to a cyclone. There is no emission stack on the air system. Curtains and air knife are uses at the entrance of the Z-Box exit to prevent emissions from escaping.
3. The cyclone utilizes a rotating air lock drop collected material out of the cyclone and onto the conveyor. Material is collected as Automobile Shredder Residue ("ASR)[1] and is processed at another facility to separate nonferrous metal from ASR.
4. A water truck is used by the facility, as needed (weather dependent), to reduce potential dust generated by traffic in the shredding yard. The water truck is used eight hours per day during dry weather and passes through the shredding yard at least four times per day. The water truck also wets down pavement outside the shredding yard on vacated S. Paulina Street.
5. A sweeper is used around the scales (both inbound and outbound) to control material buildup and reduce traffic emissions.

The following subsections provide greater detail for pollution-control methods and equipment.

[1] Nomenclature is now DNF (Dirty Non-Ferrous)

3.1 Water System

The Smart Water System is used to moisten material directly in the hammermill. The previous water system had been worked manually by the shredder operator based on his experience with material throughput. The smart Water System flow- control Valve will take input signals from the amount of amperage the electric shredder motor is drawing and the rotation speed of the main motor. The system averages these values to determine.

The maximum amount of water allowed to pass through the valve. For example, if the mill is running at 75- percent load capacity, the valve allows 75- percent of the maximum water through. Typically, the percentage of the maximum water flow needed to control dust without over saturating the material is between 45 and 65 percent. A second component of the system is compressed air, which is delivered to the water nozzle at about 40 psi and serves to atomize the water as it enters the hammermill. The Smart Water System removes manual operation of the water flow into the hammermill (crusher).

Water serves to moisten material in the hammermill for the purpose of reducing fugitive dust. Application of the water introduces sufficient moisture to keep material damp on the discharge end of the hammermill, but not too wet as to cause material to "stick" to conveyors and disrupt the flow of material. –Shredded material is then conveyed to a Z-Box system that cleans the ferrous material and subsequent magnets are used to separate ferrous from the other non-ferrous materials, which undergoes secondary (non-ferrous) metal separation at another plant.

3.2 Closed – Loop Z-Box and Cyclone

The separation system uses a recirculating Z-Box air classification system to help clean ferrous product post magnetic separation. The system is similar to a standard Z-Box classification system that uses air flow and terminal velocity to separate lighter material ("Fluff") adhering to shredded steel to produce a higher quality, cleaner product, except that the system re-circulates 100 percent of the air used to clean the ferrous product.

The air classifier is used to separate solids by air classification. The heavy fraction (ferrous metal) is the heavier than the force of the air flow up through the Z-Box and falls by gravity to the bottom and discharges the system via a vibrating table and subsequent conveyer. The non-ferrous/non-metallic portion is lighter than the force of the air flowing upward through the classifier and will be drawn through a duct system to a cyclone designed to drop larger material out through an airlock. A diagram of the Z-Box system and cyclone efficiency is included in Appendix 2 below 50 microns the cyclone efficiency start to drop. At about 10-micron-sized particles the efficiency is about 73-percent. As a result, the recirculating air system carries a certain amount of fine-grained

Dust in suspension in the air stream, which is estimated by the manufacturer to be 3,478 pounds per hour (lbs. /hr.).

As presented in the air classifier flow diagram from MAC Equipment (Appendix 2),

When air leaves the circulating fan, slightly less than 10-percent of the air is diverted to a by-pass fan that injects the air into the entrance of the Z-Box. The diverted air volume is drawn immediately after he fan at a point opposite the centrifugal rotation of the fan, therefore pulling a finer fraction of dust suspended in the air stream that results in

a lighter dust mass, as shown in the flow diagram. The second point of air- draw for the by-pass fan is from the hood enclosing the discharge end of the Z-Box system. The discharge hood is a quiet zone with no significant movement to generate fugitive dust, therefore the by-pass fan will be pulling about 175 cfm with the lightest fine-grained particles from the top of moving material. For those reasons, the dust laod represented by the manufacturer is 174 lbs. /hr. The draw of the air from between hanging curtains within the exit shroud prevents dust from escaping as materials exits the Z-Box.

A series of dust curtains are used at the Z-Box outlet and Z-Box entrance areas to prevent further dust emissions. As solids move up the conveyor from the hammermill, the shredded material moves past the series of hanging curtains that are designed to be flexible and move back and into place after material has passed. Forced air delivered into the entrance shroud between the hanging curtains results in air pressure that is less than atmosphere and prevents air and dust from exiting the shroud while material passes.

The vacuum applied to the Z-Box from the cyclone (60,000 cfm air draw) maintains a negative pressure within the top of the Z-Box to assure that air and dust is directed to the cyclone. There is no direct discharge of air to the atmosphere from the re-circulating system; however, minor amounts of air and dust has the potential to escape the classifier,

due to leakage that may occur because of ambient conditions, internal differential air pressure and unpredictable variable flow rate of material from the hammermill into the Z-Box. The re-circulating system uses a cyclone (MAC Model No.H126) within an airlock to drop out material picked up in the Z-Box. Fluff material discharged from the cyclone is conveyed to the dirty non-ferrous ("DNF") pile for additional separation of non-ferrous metals at an off-property location.

In an effort to monitor air flow at the entrance and exits of the Z-Box, pressure gauges are being installed to document that very little air escapes from the system. The pressures gauges will be placed at both the entrances and exits points. Pressure reading will be monitored on a daily base when the shredder system is operating and reading will be recorded in a pressure log.

3.3 Water Truck Usage

A water truck is used during dry weather above freezing to reduce dust that may be generated by vehicular traffic around the shredding plant. In general, trucks used to deliver scrap metal to the shredding plant enter the property at the northeast corner and across the truck scale northeast of the shredder and proceed south along eastside of the plant and then north along the west side of the plant to deliver scrap metal to the appropriate pile areas (see Appendix 1, Figure 2). After delivery of scrap metal, the trucks proceed to the northwest scale to determine tare weight. Trucks used to pick up DNF use the same route and scales, as do trucks used to pick up shredded steel product for delivery to steel mills and foundries.

The water truck uses the same route to wet the asphalt and concrete surfaces through the use of spray bars on the back side of the truck. The water truck will make a minimum of four passes per day during dry weather conditions to maintain a wet surface. Water used in the truck contains no additives (foam, soap or oils). Excess water will drain to storm sewers located around the plant if too much water is applied. The storm drains flow to the waste water treatment plant operated by MWRDGC.

3.4 Sweeper

A sweeper is used to reduce material buildup around the inbound and outbound scales and some sections of roadways. Sections of roadways are cleaned when material is observed to be accumulating. Roadway sweeping are properly disposed at an off-site landfill.

4.0 Storage Piles

The facility stores clips, sheet iron and unprepared (pre-shredded) automobile hulks around the shredding plant, as seen in Figure 2. Automobile hulk are pre-processed so that batteries, gasoline, motor oil, mercury switches and antifreeze have been removed from the hulks and contained for recycling elsewhere. Storage pile sizes obviously vary day-to-day, as influenced by metal prices and deliveries, and sales orders. The facility typically operates at less than 2,000 tons of in-feed material stockpiled for shredding, but has the storage capacity for 3,000 tons of vehicle hulks, 3,000 tons of sheet metal (appliances, siding, other light steel) and 500 tons of clips (direct from manufactures).

On the processed side of the pant, storage capacity is available for 1,500 tons of shredded steel product and 1,500 tons of DNF, for a total plant storage capacity of 9,500 tons.

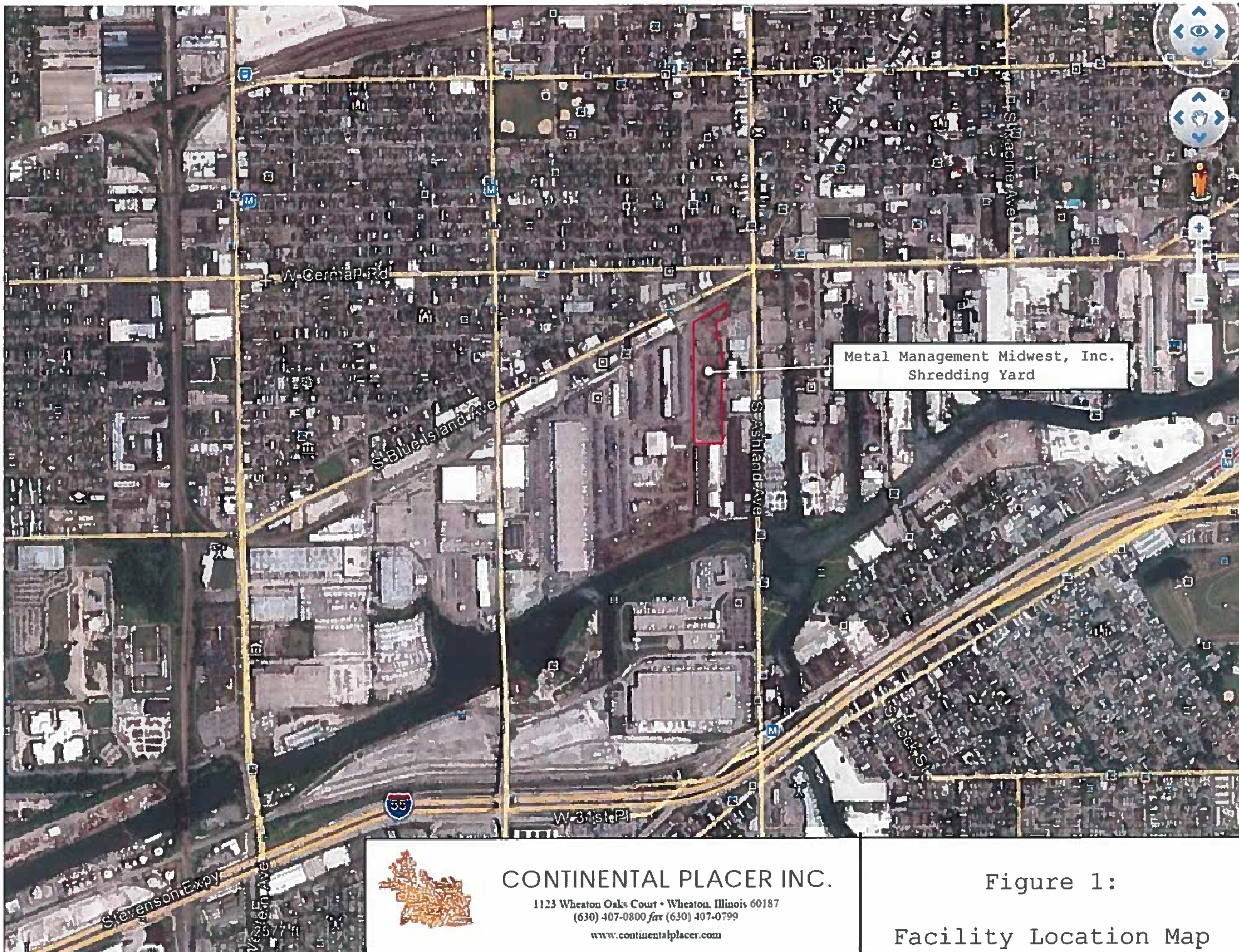
Based on AP-42 publication 12.2.4 Aggregate handling and Storage Piles, applying Equation 1 to the maximum storage capacity of the plant would be a conservative estimate of potential emissions from those piles. Most of the material delivered is unloaded through the use of hydraulics cranes and dump trucks. Using an a average moisture content of 2.53 percent (range of Source Conditions for Equation 1) and a mean wind speed for Chicago of 11.21 mph

(http://lwf.ncdc.noaa.gov/oa/climate/online/ccd/avgwind.html) over a 44-year time period, the maximum 9,500 tons of storage pile would emit 2.3E-3 lbs./ton through unloading and storage, or 21.9 lbs. per day for particulate matter greater than 10 microns. Given that the average storage of material is closer t6o 3,000 tons, the emission would be closer to 1.3 tons annually due to deliveries and storage.

Emission from storage piles do not exceed the criteria listed in 35 IAC 212.304.

APPENDIX 1

FIGURES



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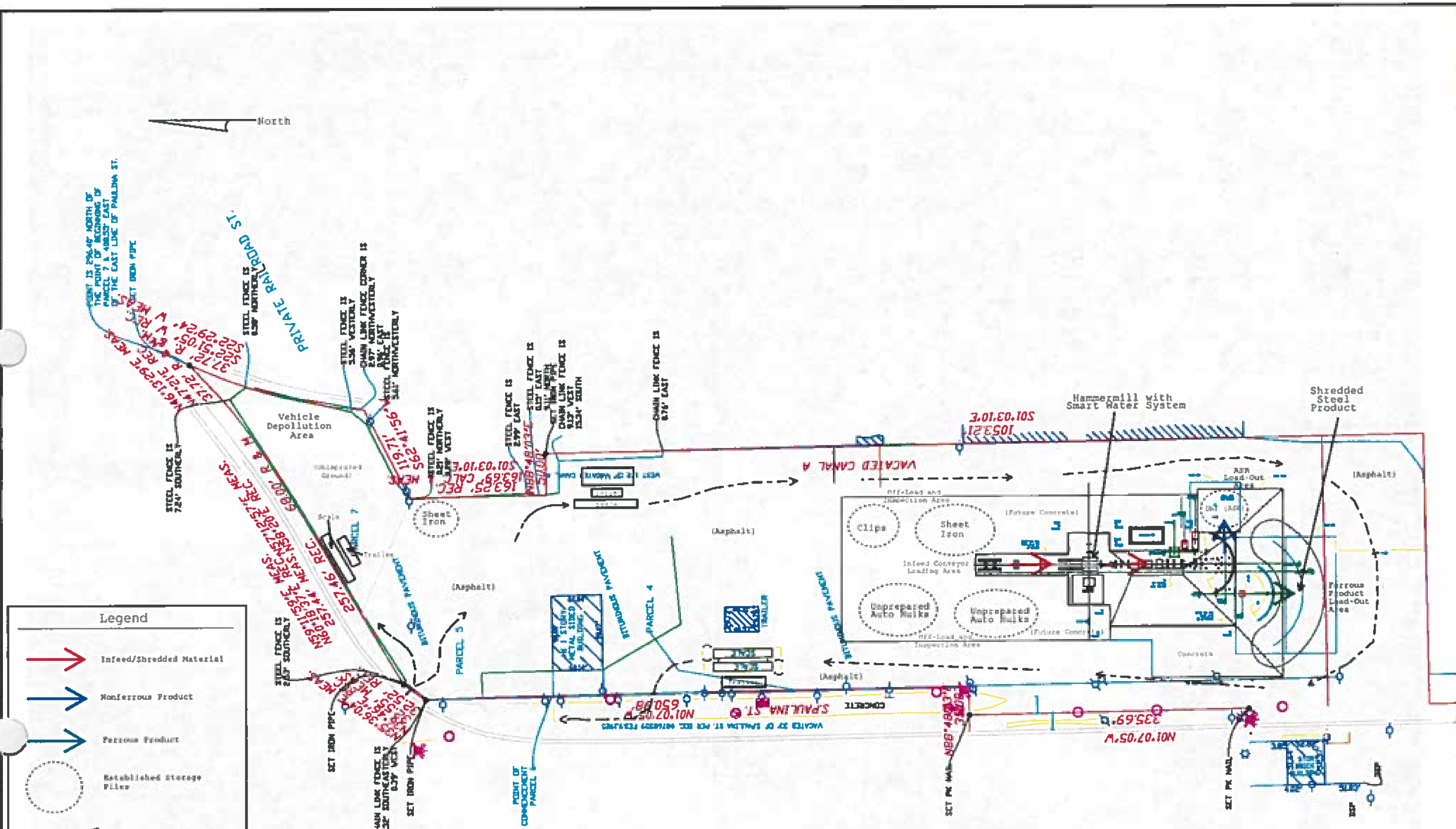
Google Earth Image: 06/30/2010

Figure 1:

Facility Location Map



Legend

Infeed/Shredded Material

Nonferrous Product

Ferrous Product

Established Storage Piles

Vehicle Traffic Flow

Approximate Scale:
1 inch = 110 feet

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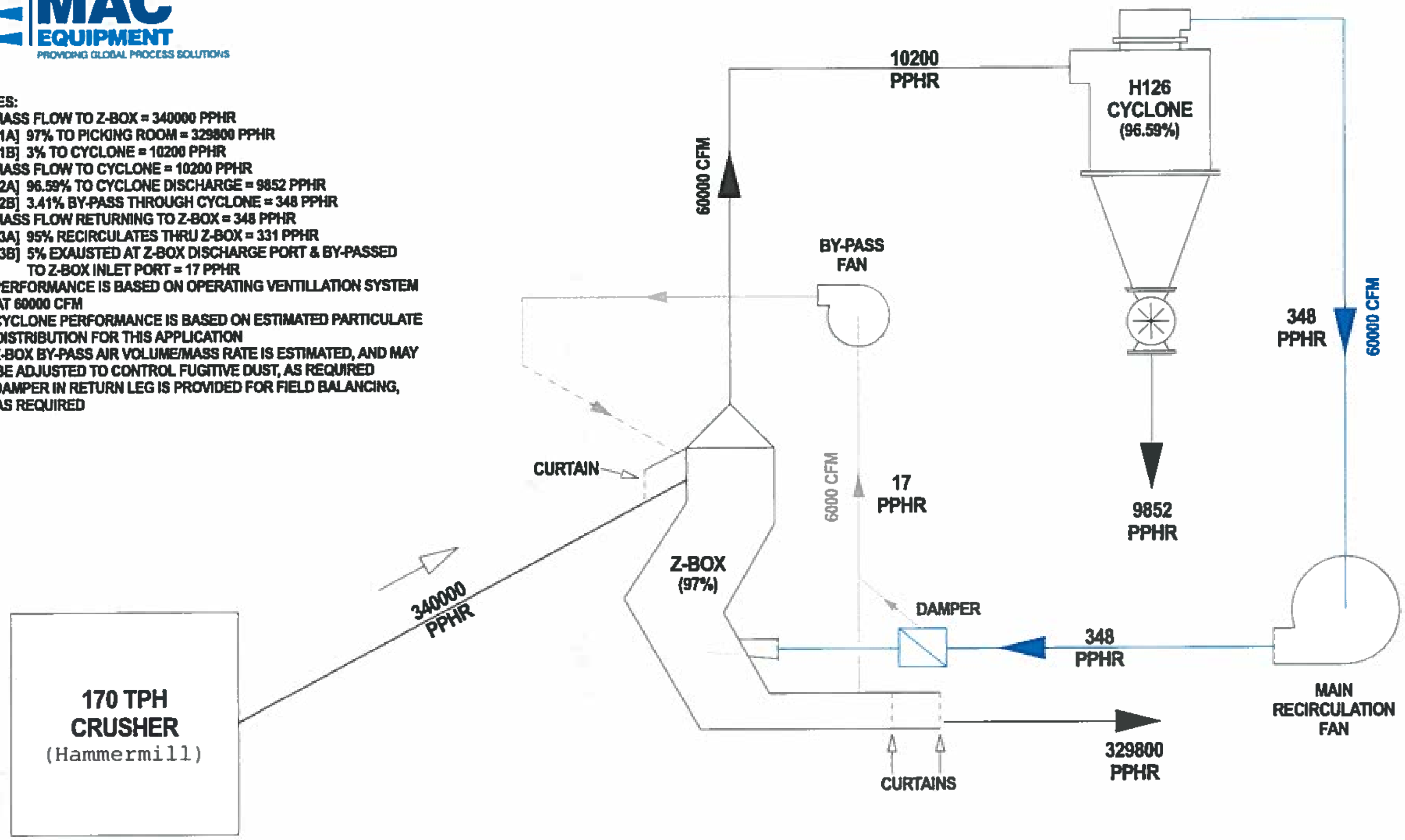
Figure 2:
Shredding Yard Layout

APPENDIX 2
Details for Z-Box and Cyclone

NOTES:
[1] MASS FLOW TO Z-BOX = 340000 PPHR
[1A] 97% TO PICKING ROOM = 329800 PPHR
[1B] 3% TO CYCLONE = 10200 PPHR
[2] MASS FLOW TO CYCLONE = 10200 PPHR
[2A] 96.59% TO CYCLONE DISCHARGE = 9852 PPHR
[2B] 3.41% BY-PASS THROUGH CYCLONE = 348 PPHR
[3] MASS FLOW RETURNING TO Z-BOX = 348 PPHR
[3A] 95% RECIRCULATES THRU Z-BOX = 331 PPHR
[3B] 5% EXAUSTED AT Z-BOX DISCHARGE PORT & BY-PASSED TO Z-BOX INLET PORT = 17 PPHR
[4] PERFORMANCE IS BASED ON OPERATING VENTILLATION SYSTEM AT 60000 CFM
[5] CYCLONE PERFORMANCE IS BASED ON ESTIMATED PARTICULATE DISTRIBUTION FOR THIS APPLICATION
[6] Z-BOX BY-PASS AIR VOLUME/MASS RATE IS ESTIMATED, AND MAY BE ADJUSTED TO CONTROL FUGITIVE DUST, AS REQUIRED
[7] DAMPER IN RETURN LEG IS PROVIDED FOR FIELD BALANCING, AS REQUIRED



PPHR = Pounds per hour
CFM = Cubic feet per minute (air flow)

Figure 3

Material Systems Technology, Inc.	MASS FLOW ANALYSIS MAC CRUSHER VENTILLATION SYSTEM RE: SIMS METAL MANAGEMENT - IL	DWG#: D10-05038.3 DATE: 09/20/10

Cyclone Calculation Results

Input Information

Customer	Wendt	System #	ims Metal Manageme
Material	Auto Scrap	Airflow (CFM)	60000
Bulk Density (PCF)	45	Gas Temperature (F)	85
True Density (PCF)	81.159		
Flow Rate (PPH)	1500	Cyclone Model	Sample HE-126

Pressure Drop

Pressure Drop (IN WC) 9.65

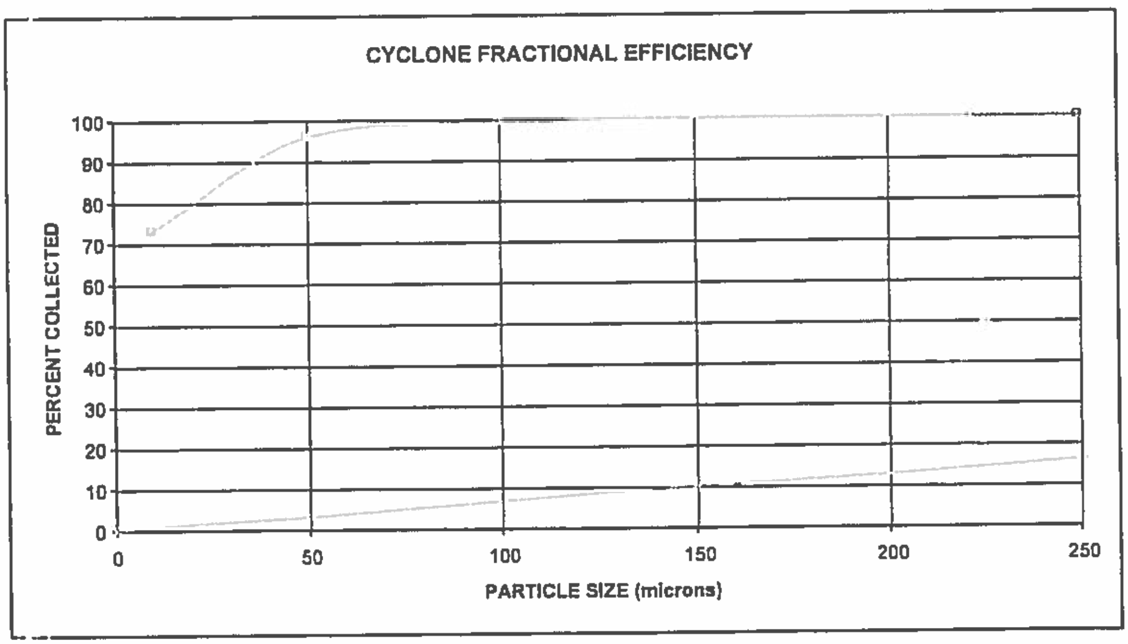
Inlet Velocity

Inlet Velocity (FT/SEC) 99.2

Efficiency Data

Particle Size (Micron)	% by Weight (%)	Inlet Loading (PPH)	Collection Efficiency (%)	Weight Collected (LBS)
1500	15.00	225.00	100.000	225.00
1000	15.00	225.00	100.000	225.00
500	15.00	225.00	99.999	225.00
250	15.00	225.00	99.964	224.92
100	15.00	225.00	99.135	223.05
50	15.00	225.00	96.035	216.08
10	10.00	150.00	73.166	109.75

Total Weight Collected	1448.80	PPH	Tot. Collection Efficiency	96.59
Total Weight Escaped	51.20	PPH	Total Escape %	3.41



This information is provided for reference only. MAC Equipment does not guarantee cyclone efficiency performance. Assumptions are used for these calculations to predict efficiencies. Actual operating conditions will vary from those contained in this document.

* For product specific fractional efficiencies a representative sample or particle size distribution is required.

** True Density is estimated at 1.3 grams/cm³. Actual true density may vary and this will vary efficiencies.